WHAT IS CLAIMED IS:

1. A flexible heat exchange interface for use in a heat exchanger, the flexible interface comprising a plate of an elastomer material penetrated by a plurality of substantially rigid thermally conductive members, each of the plurality of thermally conductive members having a first enlarged pad on at least a first side of the plate.

2. A flexible heat exchange interface according to claim 1 wherein each of the plurality of thermally conductive members project from a second side of the plate opposed to the first side of the plate.

3. A flexible heat exchange interface according to claim 1 wherein each of the plurality of thermally conductive members has a second enlarged pad on a second side of the plate opposed to the first side of the plate.

4. A flexible heat exchange interface according to claim 3 wherein at least one of the first and second enlarged pads is cramped around its edge against the elastomer material.

5. A flexible heat exchange interface according to claim 3 wherein each of the plurality of thermally conductive members comprises first and second parts, the first part including the first pad and comprising a pin engaging a socket on the second part, the second part including the second pad.

6. A flexible heat exchange interface according to claim 3 wherein at least one of the first and second enlarged pads comprises a plurality of projections, the projections projecting away from the plate.

7. A flexible heat exchanger comprising:

a volume having at least one inlet for receiving a heat exchange fluid and at least one outlet; and,

a flexible plate essentially impermeable to the heat exchange fluid, the plate comprising a plurality of substantially rigid thermally conductive members extending through a flexible material of the plate from an outside surface of the plate into the volume.

8. A flexible heat exchanger according to claim 7 wherein the volume is defined between the plate and a flexible back wall spaced apart from the plate.

9. A flexible heat exchanger according to claim 7 wherein the thermally conductive members are arranged in a rectangular array.

10 A flexible heat exchanger according to claim 9 wherein the thermally conductive members each comprise a generally rectangular pads on the outside surface of the plate.

11. A flexible heat exchanger according to claim 7 wherein the thermally conductive members are arranged in a triangular array.

12. A flexible heat exchanger according to claim 7 wherein the thermally conductive members are arranged to provide a plurality of substantially unbroken lines of the flexible material extending between the thermally conductive members.

13. A flexible heat exchanger according to claim 7 wherein the thermally conductive members each have a thermal conductivity of at least 50 $Wm^{-1}K^{-1}$.

14. A flexible heat exchanger according to claim 7 wherein the thermally conductive members each have a thermal conductivity of at least 100 $Wm^{-1}K^{-1}$.

15. A flexible heat exchanger according to claim 14 wherein the thermally conductive members are made of a material selected from the group consisting of: aluminum, copper, gold, silver, alloys of two or more of aluminum, copper, gold, or silver with one another and alloys of one or more of aluminum, copper, gold, or silver with one or more other metals.

16. A flexible heat exchanger according to claim 13 wherein the thermally conductive members are made of materials selected from the group consisting of: carbon, graphite, diamond, and sapphire.

17. A flexible heat exchanger according to claim 7 wherein a plurality of the thermally conductive members covers at least 70% of an area of the outer side of the heat exchange plate.

18. A flexible heat exchanger according to claim 7 wherein the flexible material of the plate comprises an elastomer material and the thermally conductive members are embedded in the elastomer material.

19. A flexible heat exchanger according to claim 18 wherein the elastomer material comprises a material selected from the group consisting of: polyurethane, polypropylene, polyethylene, ethylene-vinyl acetate, polyvinyl chloride, silicone, natural rubber and a combination of two or more of polyurethane, polypropylene, polyethylene, ethylene-vinyl acetate, polyvinyl chloride, and silicone.

20. A flexible heat exchanger according to claim 7 wherein the thermally conductive members project into the volume.

21. A flexible heat exchanger according to claim 20 wherein the thermally conductive members project into the volume from the inner surface of the plate by distances of at least 3 mm.

22. A flexible heat exchanger according to claim 7 wherein the flexible material of the plate has a thermal conductivity not exceeding 5 $Wm^{-1}K^{-1}$.

23. A flexible heat exchanger according to claim 7 wherein a plurality of the thermally conductive members each comprise an outer end comprising a pad on the outer side of the plate and an inner end projecting into the volume.

24. A flexible heat exchanger according to claim 23 wherein the inner end of each of the plurality of thermally conductive members comprises a plurality of spaced apart projections.

25. A flexible heat exchanger according to claim 23 wherein a plurality of the thermally conductive members each comprise a first part connected to the second part wherein the first and second parts define a circumferentially extending groove and the flexible material of the plate is received in the groove.

26. A flexible heat exchanger according to claim 23 wherein the inner end of each of the thermally conductive members is tubular, square, rectangular, cylindrical or spherical.

27. A flexible heat exchanger according to claim 7 wherein the outer surface has a concave curved configuration in the absence of bending forces acting on the heat exchanger.

28. A flexible heat exchanger according to claim 7 wherein the outer surface has a convex curved configuration in the absence of bending forces acting on the heat exchanger.

29. A flexible heat exchanger according to claim 7 wherein a portion of the outer surface of the heat exchanger on which the thermally conductive members are disposed is dimensioned to be applied exclusively to an area of a subject's anatomy overlying a carotid artery of the subject.

30. A flexible heat exchanger according to claim 7 wherein a total area of the thermally conductive members exposed on the outside surface of the plate exceeds a total cross sectional area of the thermally conductive members at a point where the cross sectional members enter the volume.

31. A flexible heat exchanger according to claim 7 wherein the volume is defined between a flexible rear wall and the flexible plate and the heat exchanger comprises spacing means for preventing the rear wall from collapsing against the flexible plate.

32. A flexible heat exchanger according to claim 7 wherein the volume is defined between the flexible plate, a flexible rear wall made of the flexible material and flexible side walls made of the flexible material.

33. A temperature control system comprising:

a heat exchanger according to claim 7;

a reservoir containing a heat exchange fluid;

a first feed pump connected to feed the heat exchange fluid from the reservoir into the input of the heat exchanger;

a second feed pump connected to withdraw the heat exchange fluid from the output of the heat exchanger.

34. A system according to claim 33 comprising a controller connected to control operation of the first and second feed pumps to maintain a pressure of the heat exchange fluid within the volume within a desired range of an ambient air pressure outside the volume.

35. A system according to claim 34 comprising an adjustable bypass valve connected in parallel with one of the first and second feed pumps wherein the controller is configured to operate an actuator to adjust the bypass valve.

36. A system according to claim 33 comprising an adjustable bypass valve connected in parallel with one of the first and second feed pumps.

37. A system according to claim 36 wherein the adjustable bypass valve is configured to be opened by a pressure differential across the bypass valve.

38. A system according to claim 33 comprising a variable restriction connected between the heat exchanger and one of the feed pumps.